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Efstratopoulou, M., Janssen, R., & Simons, J. (2012). Agreement among physical educators, teachers and parents on children's behaviours: A Multitrait-Multimethod design approach. *Research in Developmental Disabilities*, 33, 1343–1351. doi:10.1016/j.ridd.2012.03.015.

### Abstract

**Objective:** The study examines the agreement among raters on children's problematic behaviours. **Method:** A multitrait-multimethod (MTMM) matrix was applied to a normative sample of elementary school-aged children ( $N=841$ ). The participants were rated by their physical educators, using the Motor Behaviour Checklist for children (MBC; Efstratopoulou, Janssen, & Simons, 2012). Teachers and parents rated the same students using the Teacher Report Form (TRF; Achenbach, 1991b), the Child Behaviour Checklist (CBCL; Achenbach, 1991a) and the ADHD Rating Scale-IV (DuPaul, Power, Anastopoulos, & Reid, 1998). **Results:** The resulting matrix revealed significant correlations for the Rules Breaking, Lack of Attention, Hyperactivity/Impulsivity, Lack of Social interaction problem scale and for the Internalizing, Externalizing and Total scores. Convergent validity of the specific MBC subscales was supported by significant correlations with the corresponding subscales of TRF, CBCL and ADHD Rating Scale-IV. **Conclusions:** Findings underscore the importance of taking child's settings and observer influences into account and suggest that MBC is a new promising instrument that can provide valid ratings on externalizing behaviour and social problems in children when used by physical educators in school settings.

**Key words:** convergent validity, multitrait-multimethod, emotional and behavioural problems, children, physical education

Agreement among physical educators, teachers and parents on children's behaviour:  
A Multitrait-Multimethod design approach

### 1. Introduction

Detection efforts for students with emotional, behavioural and developmental disorders are particularly critical during the early educational years, when these children are most amenable to change in behavioural, social, and academic arenas and before experience negative outcomes within and beyond the school setting (Landrum, Tankersley, & Kauffman, 2003;

Lane, 2003; Volkmar, Lord, Bailey, Schultz, & Klin, 2004). Given the costs associated with these disorders to students themselves, their families, and society as a whole, it is not surprising that reducing the incidence of emotional, Behavioural and developmental disorders through systematic screening and comprehensive intervention efforts is a growing area of interest in educational research (Kauffman & Landrum, 2009; Lane, 2007; Nelson, Babyak, Gonzalez, & Benner, 2003).

### *1.1 Agreement among rating sources*

Despite the usefulness of rating instruments for screening children's deviant behaviours, the relatively modest agreements among rating sources it's a problem concerning the validity of the information and the importance of context or setting effects on children's behaviour .

Information on children's behaviour can be gathered by a number of informants who each have their own point of view. Parents can observe their child in a wide range of situations; nonetheless, information from the parents is not always reliable. The accuracy of parents as raters may vary depending on such factors as education, the amount of stress associated with the child's behaviours, and hidden agenda's that parents may have when rating a child (De Los Reyes & Kazdin, 2005). Some parents tend to follow a pattern of idealized expectations and cultural stereotypes, some may be very sensitive or may have a low threshold for certain behaviours and will exaggerate symptoms, whereas other parents may underreport deviant or troublesome child behaviours.

Modest agreement is the norm for different informants' ratings of a given child's functioning (Achenbach, McConaughy, & Howell, 1987; Achenbach, 1991a), raising concerns about the relative validity of any single source of information and creating measurement obstacles for both research and clinical endeavors. Mental health professionals have distinct opinions about the relative value of different informants for Behavioural criteria. The frequency, base rate, and conspicuousness of behaviours may affect the degree of concordance among informants (Kolko & Kazdin, 1993). Considerable literature addresses issues of method effects in cross-informant studies, and there are many explanations for rater disagreement (e.g., Gadow et al., 2004; Drabick, Gadow, & Loney, 2008). In general, concordance has been found to be higher when informants have similar relationships with the children being rated than when raters represent different roles (Achenbach et al., 1987; Greenbaum, Dedrick, Prange, & Friedman, 1994). There is also reason to believe that children's presentation of behaviour problems varies

across different settings such as the home or school (Kazdin & Kagan, 1994; Kolko & Kazdin, 1993). Additionally, cross-informant agreement may vary considerably depending on item content: Teachers may be more sensitive to disruptive behaviour and parents more to depression or anxiety (Abikoff, Courtney, Pelham, & Koplewicz, 1993). On the other hand, teachers are more likely to agree with other teachers about depressive symptoms or overall levels of depressive and aggressive behaviours (Epkins, 1995; McDermott, 1994), suggesting that there may be more cross-situational continuity in these behaviours.

Teacher reports also may be more specific for these symptoms versus disruptive or attentional problems, in as much as teachers appear less likely to over report internalizing versus disruptive problem behaviours (Abikoff et al., 1993). Another view is that agreement should be greater about externalizing behaviours, whereas internalizing behaviours might be more difficult to observe and less disruptive to family or classroom functioning and therefore less likely to attract the attention of adult informants (Kolko & Kazdin, 1993; Achenbach et al., 1987).

Clinicians and researchers generally perceive children and youth self-report as the least useful source of behaviour ratings pertaining to hyperactivity, inattention, and oppositional behaviours; whereas both youths and caregivers are preferred to teachers as sources of information about internalizing problems (Youngstrom, Loeber, & Stouthamer-Loeber, 2000).

### *1.2 The role of Physical Education teachers in the assessment procedure*

Several studies suggest evidence for the presence of externalizing and/or internalizing symptoms can be obtained in multiple active situations, and a number of Behavioural symptoms can be observed during physical education classes, team games and during standardised play procedures (Mol Lous et al., 2002; Kashani, Allan, Beck, Bledsoe, & Reid, 1997). However, there are only a few instruments that use physical educators as main source of information about children's development and the majority of them are focusing on movement and motor coordination problems like the Bruininks-Oseretsky Test of Motor Proficiency (BOT-2; Bruininks & Bruininks, 2005), the Test of Motor Development (TGMD; Ulrich, 2000), or the Movement Assessment Battery for Children (MABC-II; Henderson & Sugden, 2007), which assess gross and fine motor skills, problems in concentration, balance and levels of motor skill development as part of psychological test batteries, for making decisions about educational placement, developing and evaluating intervention programs.

The DSM-IV criteria for Disruptive behaviour disorders (DBDs) include several items related to motor characteristics (American Psychiatric Association, 2000). During physical activities, children with ADHD exhibit age-inappropriate features of hyperactivity, excessive impulsivity, problems in lateralization, and are often left-handed (Corrigan, 2003; Reid & Norvilitis, 2000). Children with conduct problems at educational settings deviate from school and social principles, rules and regulations; display delinquent behaviour, difficulties in social relationships, aggressiveness, combustible disobedience, anger, lack in empathy or concern for others, misperception of the intent of others in ambiguous social situations, lack in guilt or remorse, and low self-esteem (Dodge, 1993).

The importance of examining the interaction of peer relationships and other social relationships in the physical activity context, and the value of using the physical activity setting to promote quality peer relationships have been established (Smith, 2003). Motor related behaviours observed in children with developmental disorders include physical aggression, self injury, property destruction, stereotyped behaviours, and tantrums which are highly disruptive to classroom, community, and home environments and without intervention, they are more likely to increase than improve (Horner, Carr, Strain, Todd, & Reed, 2002). During physical activities, children with ASD, indicate stereotyped and repetitive motor mannerisms, impairments of facial expression, postures, and gestures, and are often characterized as clumsy and as having problems in motor coordination (Berkeley, Zittel, Pitney & Nichols, 2001; Piek & Dyck, 2004). Physical education teachers spend a lot of time with the children and have the flexibility to work with them and observe their behaviours in several ways (e.g., structured lessons or free play situations) and in several different settings (inside or outside the classroom, at the playground or at the school-yard). However, there is a lack of literature concerning the investigation of the added value of the information provided by physical educators on children's emotional, behavioural and social problems in school settings.

### *1.3 Hypotheses of the current study*

The study aimed to investigate the convergent validity of the Motor Behaviour Checklist (MBC; Efstratopoulou, Jansen, & Simons, 2012) using data from a typical elementary school-aged sample. A Multitrait-Multimethod (MTMM) research design (Campbell & Fiske, 1959) was used to examine the validity of specific problem scales of the MBC. Correlations among scores on related problem scales were examined. Using data from three different sources of information, (i.e., physical educators, teachers and parents), and ratings on four Behavioural

assessment instruments (MBC, Efstratopoulou et al., 2012; TRF, Achenbach, 1991b; CBCL, Achenbach, 1991a; ADHD Rating Scale-IV, DuPaul et al., 1998) the agreement among different raters on specific problem scales was also investigated.

The following hypotheses were tested:

- i) There are significant correlations among corresponding scales of the instruments used. More specifically, convergent relationships are expected for the Rules Breaking problem scale of MBC and the Delinquent Behaviour scales of TRF and CBCL. In addition, onvergent relationships are also expected on Attention problem scales, Social Problem scales, Externalizing, Internalizing, and Total scores.
- ii) The Multitrait correlations, discussed above, are significantly higher when measured by raters in school settings (e.g. teachers; physical educators) than when measured across settings (e.g. teachers; parents).

## **2. Method**

### *2.1 Participants*

The data derived from 35 typical Greek elementary schools widely spread across the country selected so that the sample distribution would be representative of the urban and rural population. The schools were located in urban areas (63.3%) and in rural areas and islands (36, 7%). The data analysed were collected from a randomly selected sample ( $N= 841$ ) of elementary school-aged children. The overall sample was consisted of 421 (50, 1%) girls and 420 (49, 9%) boys, ranging from 6 to 11 years ( $M=8.4$  years,  $SD=1.7$  years) and they had the Greek nationality (99 %).

### *2.2 Assessment instruments*

#### *2.2.1 Motor Behaviour Checklist (MBC) for children*

The Motor Behaviour Checklist for children (MBC; Efstratopoulou, Janssen, & Simons, 2012) is a scale designed to be completed by the physical education teacher who knows the child well enough to rate his/her motor behaviour. Raters were asked to observe the child during physical education classes and free play situations and to rate each behaviour on a Likert scale ranging from “never” (0) to “almost always” (4). The MBC for children consistsof 59 motor related behaviour items included in two broadband factors (‘Externalizing’ and ‘Internalizing’) and seven problems scales: ‘Rules Breaking’ (7 items), ‘Hyperactivity/impulsivity’ (14 items), ‘Lack of Attention’ (10 items), ‘Low energy’ (4 items), ‘Stereotyped Behaviour s’ (2 items),

‘Lack of Social interaction’ (10 items), and ‘Lack of Self regulation’(12 items). The internal consistency (ranging from  $\alpha=.82$  to  $\alpha=.95$ ), the reproducibility (ranging from  $ICC=.85$  to  $ICC=.90$ ) and the interrater agreement (ranging from  $ICC=.75$  to  $ICC=.91$ ) are excellent suggesting that the MBC for children is an instrument homogenous in content, with high temporal stability and high correlation agreement. In addition, the discriminant validity of the list was established in a study using clinical samples of elementary school-aged children (Efstratopoulou, Janssen, & Simons, 2012).

### *2.2.2 Child Behaviour Checklist (CBCL) and Teacher Report Form (TRF)*

One of the most popular approaches to measure childhood behaviour problems has been to use rating scales that are completed by either parents or teachers. The Child Behaviour Checklist (CBCL; Achenbach, 1991a) and Teacher Report Form (TRF; Achenbach, 1991b) are among the most widely used measures of children’s emotional and Behavioural problems in both clinical and research settings. The items measure three broad-band scales: Internalizing, Externalizing, and Total Problems, and eight syndrome scales: Withdrawal, Somatic Problems, Anxiety/Depression, Social Problems, Thought Problems, Attention Problems, Delinquent Behaviour, and Aggressive Behaviour (Achenbach, 1991a, 1991b). The items on both CBCL and TRF, were rated as Not True (0), Somewhat or Sometimes True (1), or Very True or Often True (2), and summed to yield (a) eight syndrome scale scores, (b) six DSM-oriented scale and (c) broad-band scale scores (including internalizing and externalizing total scores). With well-established normative data and standardized clinical cutoffs, the instruments have demonstrated strong psychometric properties (Achenbach, 1991; Chen, Faraone, Biederman, & Tsuang, 1994; Drotar, Stein, & Perrin, 1995).

### *2.2.3 ADHD Rating Scale-IV*

The ADHD Rating Scale-IV (DuPaul, Power, Anastopoulos, et al., 1998) is a reliable and easy-to-administer instrument both for diagnosing ADHD in children and adolescents and for assessing treatment response. Containing 18 items, the scale is linked directly to DSM-IV (American Psychiatric Association., 2000) diagnostic criteria for ADHD. The manual provides two versions of the scale: a parent questionnaire on home behaviours, and a teacher questionnaire on classroom behaviours. The items on ADHD scale, were rated as; almost never (0), rarely (1), many times (2), very often (3) and summed to yield (a) a total score and (b) separate scores on attention and on hyperactivity/ impulsivity items.

### *2.3 Procedure*

All participants and their legal guardians underwent standardized Institutional Review Board-approved notice of privacy and consent procedures. The study was in line with the guidelines given by the Research Ethics Board of the K.U. Leuven and was approved by the Pedagogy Department of Greek Ministry of Education. The participant's classroom teachers ( $N=210$ ) were asked to select in a random way, four children (two boys and two girls) from each grade and to rate them on the TRF (Achenbach, 1991b) and ADHD Rating Scale-IV (DuPaul et al., 1998). The physical education teachers of the schools ( $N= 62$ ) were asked to rate the same students using the Motor Behaviour Checklist (MBC) for children. In addition, the parents of the participant's children were asked to fill in the parent's version of Achenbach's test (CBCL, Achenbach, 1991a) and the parent's form of the ADHD Rating Scale-IV DuPaul et al., 1998). The parents were informed about the aim of the study and the assessment procedure, by the research assistant and the classroom teacher of the school. It was clarified that the children were selected in a random way, and that the data will be treated as anonymous and confidential.

### *2.4 Statistical Analysis*

#### *2.4.1 The Multitrait-Multimethod analysis*

The Multitrait-Multimethod MTMM analysis (Campbell & Fiske, 1959) was invented to investigate the convergent validity of scales on the basis of their inter correlations and has proven to be one of the most powerful tools for detecting trait, method, and error components of a measurement. Multimethod research designs are nowadays preferred to single method designs in almost all areas of psychological research (Eid & Diener, 2006) as is proven by an increasing number of studies include investigation of social adaptation, and deviant behaviour (Allen, Porter, McFarland, Marsh, & McElhaney, 2005); childhood depression and anxiety (Tram & Cole, 2006); parenting effects on the mental health of bereaved children (Kwok, et al., 2005); temperament in early childhood and aggressive behaviour in children (Majdandzic & van den Boom, 2007; Ostrov & Crick, 2007). More sophisticated MTMM models (e.g., Eid, 2000; Eid, Lischetzke, & Nussbeck, 2006; Marsh, 1989; Marsh & Grayson, 1995) may serve to answer research questions related to measurements and the convergence relations



between ratings measured by different raters or different methods. Tables of correlations arranged to facilitate the interpretation of the assessment of validity are created.

The method assumes that each of several concepts (called *traits* (Campbell & Fiske, 1959) is measured by each of several instruments (e.g., MBC; Efstratopoulou et al., 2012; TRF, Achenbach, 1991b; CBCL, Achenbach, 1991a and ADHD Rating Scale-IV, Du Paul et al., 1998) using data from different raters. Campbell and Fiske (1959) suggested that validity coefficients should be higher than values lying on its column and row in the same hetero method block and these values should be significantly different from zero and sufficiently large to encourage further examination of validity. Six parallel or like-named categories from TRF and CBCL were selected for this study. Because the measures were of the same trait or concept, it was expected to be strongly correlated and these values considered being monotrait hetero method correlations. Since the MTMM is organized into method blocks, there is one nationality Greek 99.4% 100% 100% 99.4%, Age in years 8.4 (1.7), Experience in years 11.4 (4.2). validity diagonal in each method block. The Statistical Package for the Social Sciences (SPSS 15.0., 2006) was used for the analysis of the data.

### 3. Results

The convergent validity of the Motor Behaviour Checklist problem scales (MBC, Efstratopoulou, et al., 2012) was examined through the correlation coefficients along the validity diagonals. A multitrait-multimethod- correlation matrix (Campbell & Fiske, 1959) of all the inter-correlations between the six subscales and the three measurements (physical educators, teachers and parents) was generated, and the results are in Table 2. Convergent validities are the bold values.

Examination of the validity diagonals confirms the convergent validity of these MBC subscales. The subscales of MBC appear to confirm the initial hypothesis (i) that there are significant correlations among corresponding scales of the instruments used. More specifically, the problem scales of MBC for children (Rules Breaking, Lack of Attention, Lack of Social interaction, Externalizing, Internalizing and Total scale) demonstrated significant convergence with TRF (Achenbach, 1991b) scales (Delinquent, Attention problems, Social problems, Externalizing, Internalizing and Total scale) with coefficients of  $r = .58$  ( $p < .01$ ),  $r = .56$  ( $p < .01$ ),  $r = .33$  ( $p < .05$ ),  $r = .58$  ( $p < .01$ ),  $r = .46$  ( $p < .01$ ) and  $r = .52$  ( $p < .01$ ), respectively.

In addition, the mean scores of the six subscales of the MBC (Rules Breaking, Lack of Attention, Lack of Social interaction, Externalizing, Internalizing and Total scale) demonstrated positive relationships and significant convergent with the mean scores on the CBCL (Achenbach, 1991a) scales (Delinquent, Attention problems, Social problems, Externalizing, Internalizing and Total problem scale) with coefficients of  $r=.52$  ( $p<.01$ ),  $r=.52$  ( $p<.01$ ),  $r=.28$  ( $p<.05$ ),  $r=.52$  ( $p<.01$ ),  $r=.34$  ( $p<.01$ ), and  $r=.48$  ( $p<.01$ ), respectively. Concerning the examination of the initial hypothesis (ii) the results revealed that the correlations between the mean scores of physical educators and classroom teachers were higher than between Agreement among raters on children's behaviour

**Table 2.** Correlation Matrix: Motor Behaviour Checklist (MBC), Teacher Report Form (TRF), and Child Behaviour Checklist (CBCL) subscales.

Physical Educators

*MBC*

Teachers *TRF* Parents *CBCL*

**MBC** 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

1.Rules -

2.Attention .42\*\* -

3.Social .17\* .36\*\* -

4.Externalizing .78\*\* .85\*\* .21\* -

5.Internalizing .13\* .15\* .79\*\* .19\*

6.Total Scale .76\*\* .83\*\* .62\*\* .87\*\* .63\*\* -

**TRF**

7.Delinquent .58\*\* .37\*\* .03 .45\*\* .09 .35\*\* -

8.Attention .36\*\* .56\*\* .10\* .45\*\* .12\* .41\*\* .55\*\* -

9.Social .24\* .19\* .33\* .16\* .27\* .21\* .48\*\* .67\*\* -

10.Externalizing .43\*\* .33\*\* .10\* .58\*\* .17\* .41\*\* .91\*\* .81\*\* .71\*\* -

11.Internalizing .06 .07 .27\* .10\* .46\*\* .27\* .33\*\* .36\*\* .61\*\* .29\*\* -

12.Total Scale .37\*\* .28\* .27\*\* .41\*\* .22\* .52\*\* .84\*\* .91\*\* .78\*\* .89\*\* .33\*\* -

**CBCL**

13.Delinquent .52\*\* .23\*\* .04 .41\*\* .06 .32\*\* .47\*\* .45\*\* .38\*\* .44\*\* .24\* .46\*\* -

14.Attention .27\* .52\*\* .13\* .42\*\* .11\* .37\*\* .50\*\* .46\*\* .40\*\* .54\*\* .16\* .56\*\* .84\*\* -

15.Social .10\*\* .09 .28\* .18\* .24\* .19\* .38\*\* .35\*\* .33\*\* .39\*\* .22\* .40\*\* .64\*\* .56\*\* -

16.Externalizing .33\*\* .31\* .11\* .52\*\* .13\* .39\*\* .51\*\* .48\*\* .42\*\* .48\*\* .16\* .51\*\* .87\*\* .74\*\* .70\*\*

-

17.Internalizing .14\*\* .17\* .27\* .10\* .34\* .17\* .33\*\* .21\* .24\*\* .27\*\* .31\*\* .32\* .67\*\* .47\*\* .65\*\* .57\*\* -

18.Total Scale .30\* .26\* .29\* .39\*\* .23\* .48\*\* .52\*\* .45\*\* .42\*\* .52\*\* .27\* .42\*\* .90\*\* .75\*\* .83\*\* .82\*\* .82\*\* -

\*Correlation is significant at  $p < .05$

\*\*Correlation is significant at  $p < .01$

the mean scores of physical educators' and parents' ratings for all the subscales studied. The convergent validity of the 'Lack of Attention' and 'Hyperactivity/Impulsivity' scales of MBC (Efstratopoulou et al., 2012) were also examined separately with ratings on ADHD Rating scales (DuPaul et al., 1998). A multimethod correlation matrix (Campbell & Fiske, 1959) of all the inter correlations between the two subscales (Attention, Hyperactivity/Impulsivity) and the three measurements (physical educators, teachers and parents) was generated, and the results are in Table 3. Convergent validities are the bold values.

The results appear to confirm the hypothesis that there is a convergent relationship between the mean scores on 'Lack of Attention' and 'Hyperactivity/Impulsivity' problem scales when measured by different instruments (MBC and ADHD rating scales) and by different raters (e.g. physical educators, teachers, parents). More specifically, the 'Lack of Attention' and 'Hyperactivity/Impulsivity' problem scales of MBC demonstrated convergent relations with ADHD Rating scale-IV (teachers' version) with correlation coefficients of  $r=.55$  ( $p<.01$ ), and  $r=.61$  ( $p<.01$ ), respectively. The 'Lack of Attention' and 'Hyperactivity/Impulsivity' problem scales of MBC demonstrated also convergent relations with ADHD rating scale (parents' version) with correlation coefficients of  $r=.43$  ( $p <.01$ ), and  $r=.35$  ( $p<.01$ ), respectively. With regard to the attention and hyperactivity/impulsivity scales, the correlations found between physical educators and teachers were higher than between physical educators and parents for both scales.

Finally, concerning the inter correlations among the MBC subscales, the results indicated moderate and positive relationship of  $r=.42$  ( $p<.01$ ) between 'Rules Breaking' and 'Lack of Attention' scales, low and positive correlation of  $r=.17$  ( $p<.05$ ) between 'Lack of Social interaction' and 'Rules Breaking' and a moderate positive correlation of  $r=.36$  ( $p <.01$ ) between 'Lack of Attention' and 'Lack of Social interaction' scale. With regard to the 'Externalizing' and 'Internalizing' scales of MBC the correlation coefficient between the mean scores was  $r=.19$  ( $p<.05$ ).

#### **4. Discussion**

The purpose of this study was to investigate the convergent validity of the Motor Behaviour Checklist (MBC; Efstratopoulou et al., 2012) using data from a typical elementary school-aged sample. The MTMM model (Campbell & Fiske, 1959) was used in order to examine the agreement among raters on children's problematic behaviour. Based on the MTMM design we created tables of correlations to examine the validity diagonals between similar constructs (subscales) rated by different raters and we tested hypotheses concerning the relationships among problem scales.

The results indicated that the independent measurement methods significantly demonstrated convergence with all the scales studied. That is, the measurement methods did show a significant degree of convergent or concurrent validity with the Behavioural problem scales of 'Rules Breaking', 'Lack of Attention', 'Hyperactivity/Impulsivity', 'Lack of Social interaction', 'Externalizing', 'Internalizing' and 'Total Scale'. As it was hypothesized, there was a convergent relationship between the Rules Breaking scale of MBC (Efstratopoulou et al., 2012) and the Delinquent scale of TRF (Achenbach, 1991b) and CBCL (Achenbach, 1991a), and between the 'Lack of Attention' problem scale of MBC and the attention scale of TRF and CBCL. The results indicated positive and significant correlations among the mean scores, the correlations being significantly higher between physical educators and teachers than between physical educators and parents. These results are consistent with literature indicating that concordance has been found to be higher when informants have similar relationships (e.g., teacher- physical educator) with the children being rated (Achenbach et al., 1987; Greenbaum et al., 1994) than when raters represent different roles (e.g., physical educators, parents). Interestingly, for the 'Lack of Social interaction' scale the correlations among the MBC and social problems scale of TRF and between the MBC the social problems scale of

CBCL were significant but rather low although the similarity in content. One possible explanation for this low correlation could be the different settings in which the child was being rated. Even when both raters are educators there are differences concerning the motor behaviour characteristics of a child that can be observed and recorded in school settings. For example, during physical education class and group play situations the social participation of children, as members of a team, is motivated and students are forced, by the nature of the lesson, to cooperate and to socialize. The child is more motivated to participate in group play

situations and team games than during classroom lessons or at home and this could limited the possibility for a child to be rated as alone and isolated by peers. In addition, research in emotional and behavioural problems in children also indicates that Internalizing behaviour s like social problems, anxiety and depression are more likely to be ignored (Abikoff et al., 1993) as often less apt to capture teacher's attention relative to students with Externalizing tendencies (Lane, 2007). These reasons could also justify the fact that the correlations between the MBC and TRF on behaviour s like Delinquent and Attention problems and on Externalizing mean scores were significantly higher than the correlations between the MBC and the TRF on the Social problem scale and the Internalizing scores. In addition, the correlations were higher for the 'Externalizing' scales (Rules Breaking and Lack of Attention) and 'Externalizing' scores between the MBC and the CBCL than between the 'Lack of Social interaction' scale and 'Internalizing' scores of the MBC and the CBCL.

An issue that has to be discussed is the high correlation that was observed between the Delinquent and Attention problem scales on parents' ratings. Although that, based on existing research (Neuman et al., 2001; Newcorn et al., 2001; Moffit, 2003; Moffit, Caspi, Rutter & Silva, 2001), we expect significant associations on attention and rules breaking scales, the high correlation ( $r=.84, p<.01$ ), for parents' ratings indicates that maybe parents are not in a position to distinguish between inattention and delinquent children's behaviour s. For the same scales (Rules Breaking and Lack of Attention) the correlations for physical educators (MBC) was positive and moderate ( $r=.42, p<.01$ ) and for teachers (TRF, Delinquent and Attention problems) was also moderate ( $r=.55, p<.01$ ). One possible reason is the fact that in home settings the Rules to follow are quite different than in school settings and this could possible means that parents perceived delinquent or rules breaking behaviour s in a quite different way than the teachers and the physical educators in school settings. In addition, behaviour s like: the child is careless or can't focus on tasks or can't stay still, or even talk too much and interrupt others, may be perceived as disobedience from the parents' point of view.

With regard to the ADHD behaviour s, as it was hypothesized, there were significant correlations on 'Lack of Attention' and 'Hyperactivity/Impulsivity' scales between MBC and ADHD Rating scales. High correlations were also observed between the Lack of Attention and Hyperactivity/Impulsivity scales on physical educators ratings on MBC and between attention and hyperactivity/impulsivity scales on teachers' and parents' ratings which was up to a point expected by the fact that there is high coexistence of these ADHD behaviour s.

Finally, it must be noted that the MBC for children showed greater convergent validity with teachers' reports than with parents' report in all scales measured. Agreement between physical educators and classroom teachers was significantly higher than between physical educators and parents, suggesting that although parents are useful informants of their children's behaviour, educators have another point of view and are able to observe and rate the children in a more systematic and comparative way.

A last step in the analysis of the results was the correlations revealed among the MBC subscales. It appears that although there were moderate correlations between 'Externalizing' problem scales on MBC, the distinction between the externalizing and internalizing behaviours has some merit; although in clinical practice children with Behavioural problems tend to exhibit a mixture of internalizing and externalizing problems (Roussos et al., 2001).

#### *4.1 Implications, limitations and recommendations for future research.*

The findings of this study are quite encouraging for the future use of MBC (Efstratopoulou et al., 2012) for children in elementary school-aged population. Taking into consideration that early identification for emotional and/or Behavioural problems can help to minimize the long-term harm of mental disorders and reduce the overall healthcare burden and costs (Aos, Lieb, Mayfield, Miller, & Pennucci, 2004), the MBC for children could be used for various educational purposes including research projects and intervention programs and may contribute to physical educators in developing class management techniques and assess the effectiveness of their interventions with a pre-post administration. A further and more in depth accurate psychological assessment must follow this initial "screening" as the aim of MBC is not to provide a clinical diagnosis but to facilitate teaching procedure for physical education teachers in school settings and help them in their important decision to refer these students for further clinical evaluation.

Limitations of the present study include that the different informants described children behaviour in partially overlapping contexts (e.g., parents report deriving from home functioning, teacher report from class functioning, and PE report from school-contexts). This lack of situational concordance matches how these instruments are generally used in research and clinical work, but it makes it difficult to discern whether disagreements reflect true differences in behaviour across settings versus differences in perceptions among raters.

Another potential weakness of the research which could limit the generalizability of the results is the fact that the participants were typical Greek children in which possible differences on their motor related behaviours due to age or gender were not investigated in this study. Future studies could focus on possible differences on the way that physical educators rate deviant behaviour (e.g., related to attention problems or rules breaking) for boys or girls or for first grade students in comparison with older students, during physical education classes in school settings.

Concerning the moderate agreement among rating sources on children's deviant behaviour, future studies could focus on understanding why different raters often observe the same behaviours in different ways. Thus, future investigations should focus on why informants view children's Behavioural problems similarly or differently and how this information could be valuable on the problems being assessed in a greater understanding of how to intervene in order to change these problematic behaviours within the school context.

In addition, as research studies suggest that teachers' characteristics, including self efficacy, Behavioural standards, stress and working burnout (Egry & Short, 2006), may influence their ratings, it could be interesting to take into consideration in a future study several types of teachers' and physical educators' characteristics in order to investigate from this point of view the agreement between these raters on students' behaviour in school settings.

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